Precision metal optics over a large temperature range

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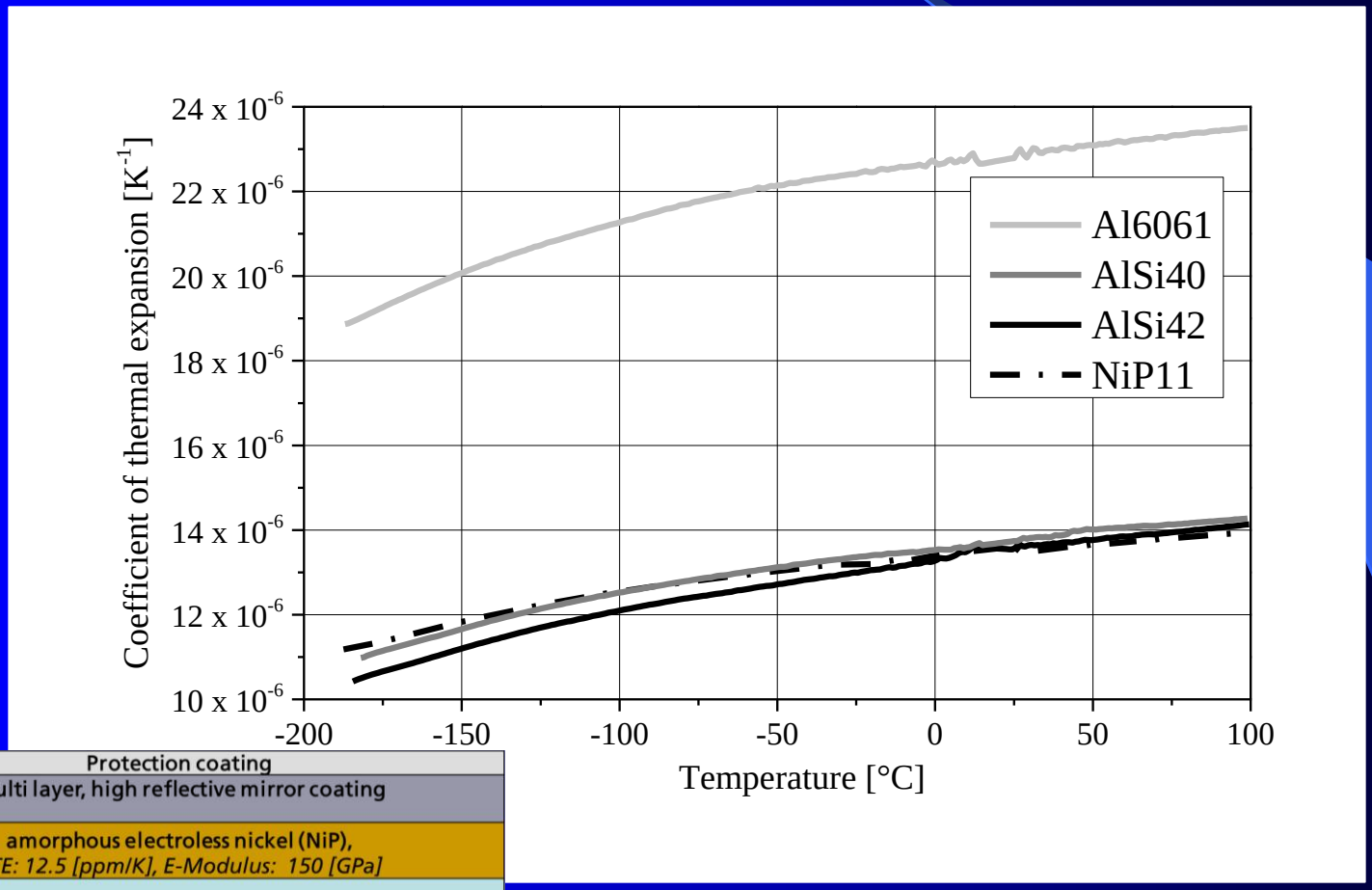
Konstruktion

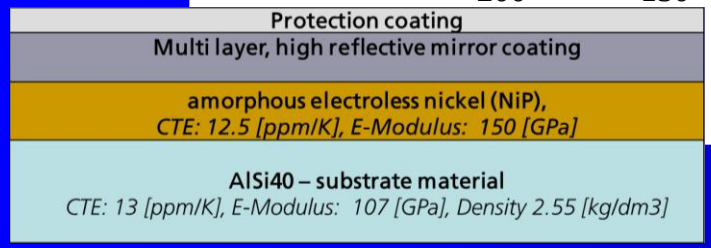
ASTRO TECH TALK

Metal Optics

- Uniform shrinking will support the optical stability of the instrument for overall temperature changes
- Easy mounting
- High thermal conductivity ensuring low thermal gradients and high mechanical stability
- Diamond turned surfaces only for infrared applications (roughness due to turning marks and material microstructure only 5 -10 nm rms)
- Polishable NiP-layer for low surface roughness necessary
- Materials: **Al6061 (AlMg1SiCu)**, ***AlSi40*,** Beryllium, Copper (Laser)

Coefficient of Thermal Expansion (CTE)





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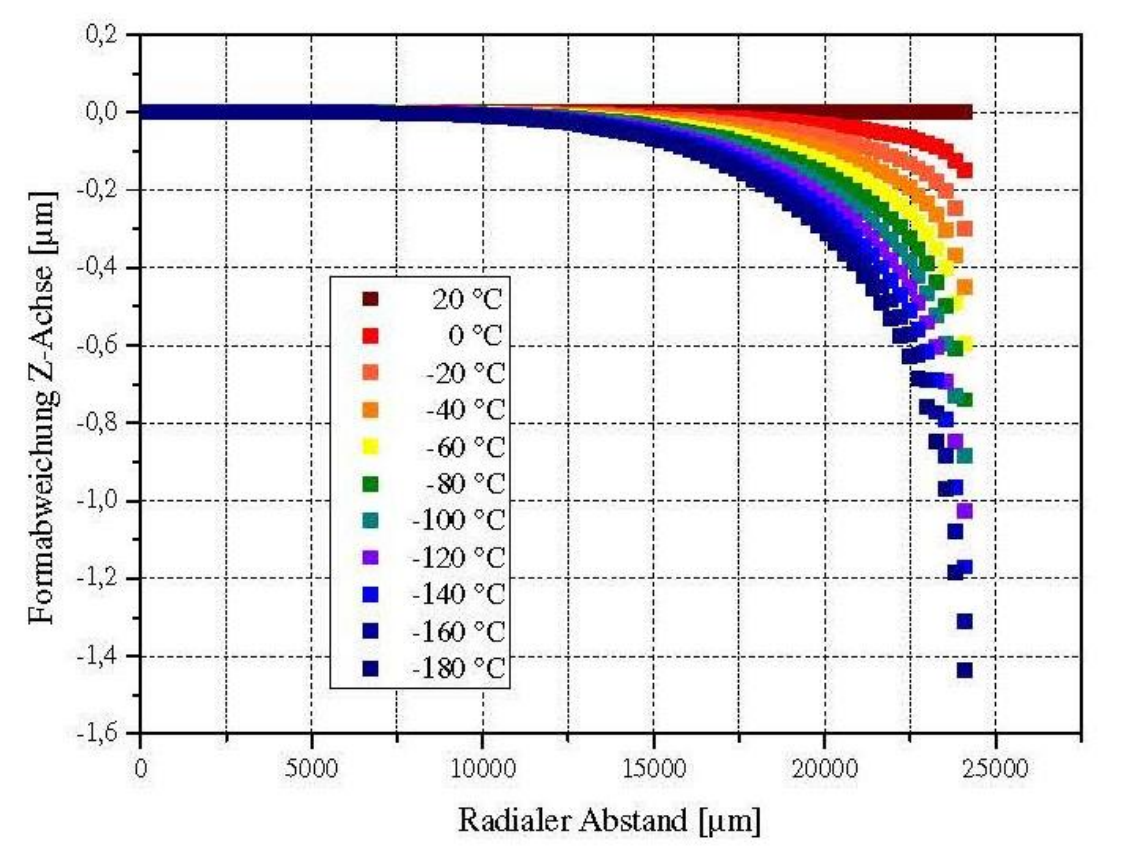
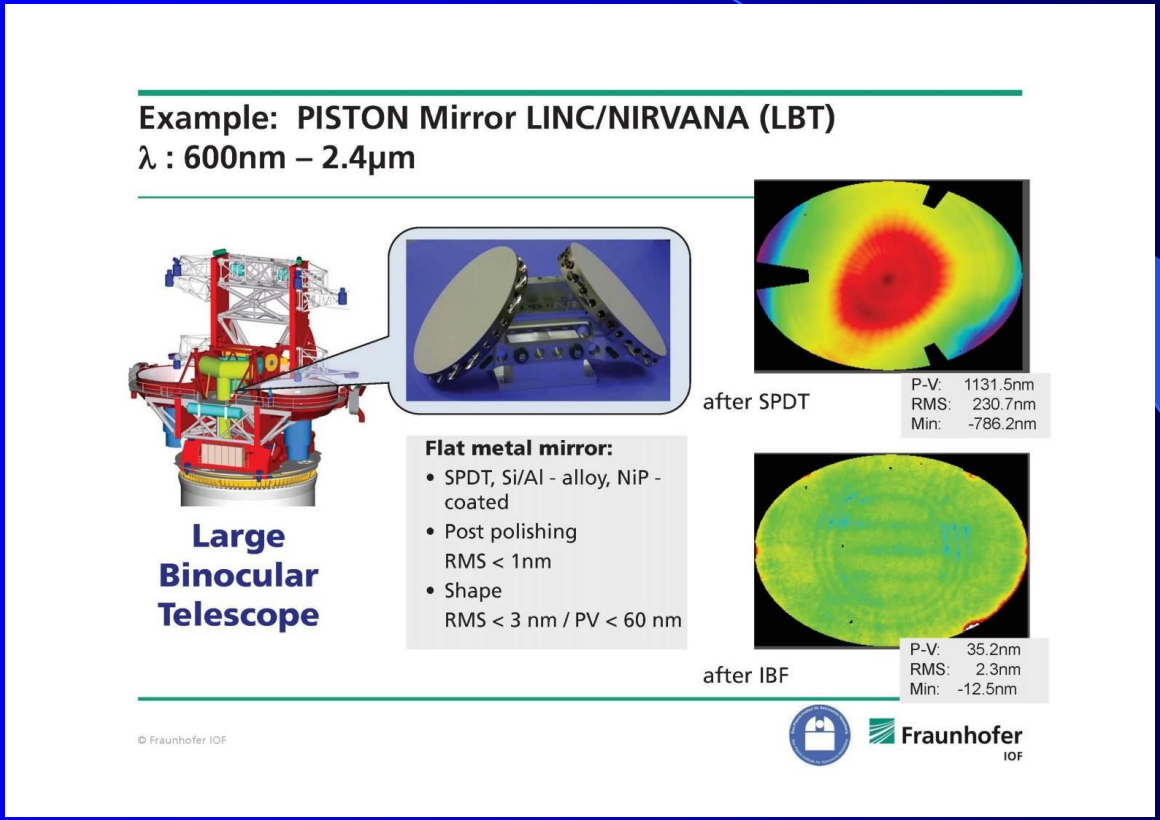
Form Deviation



Al6061 + 80 µm NiP (FE-Simulation)
Thickness 15 mm

LN Piston Mirror



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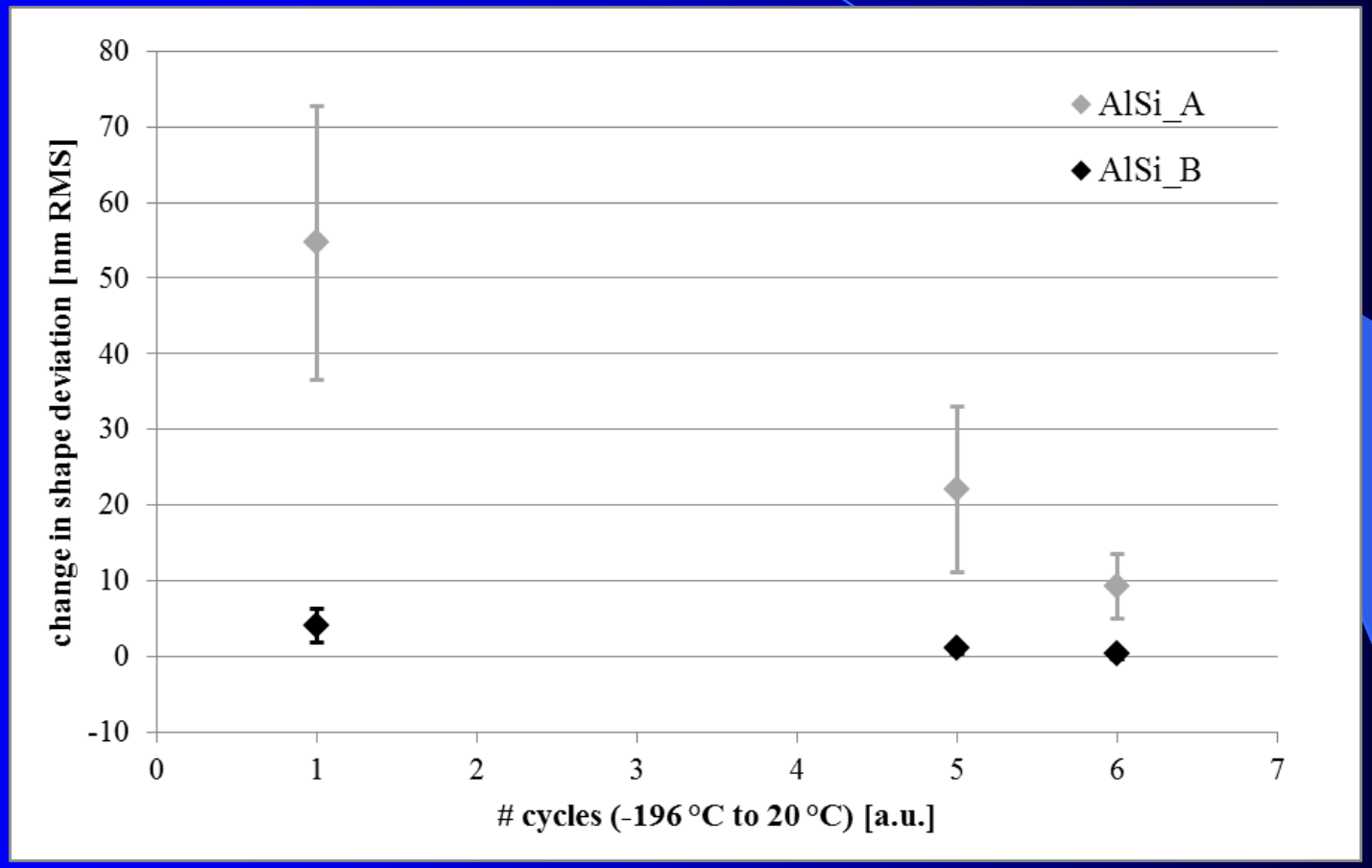
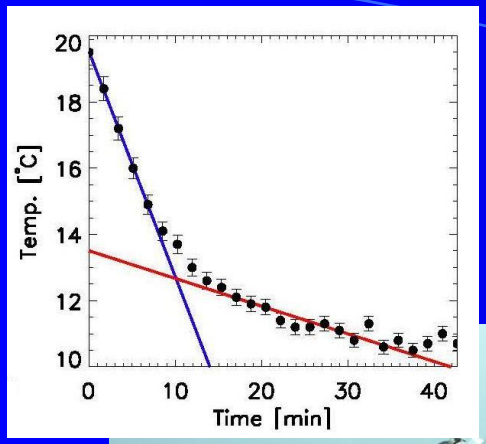
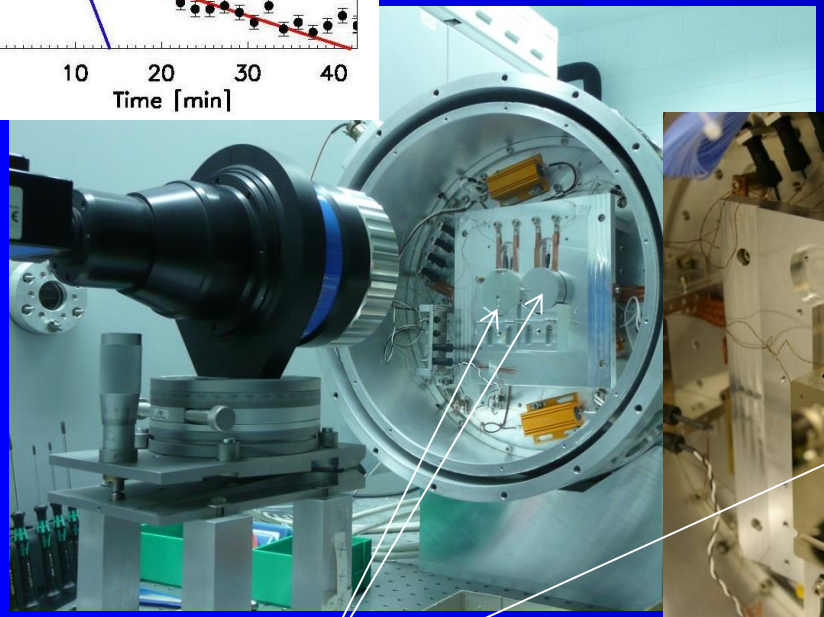
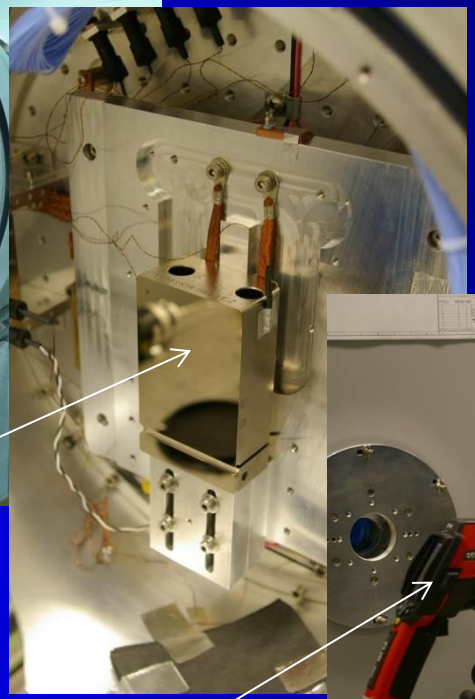
Dimensional Stability of AlSi

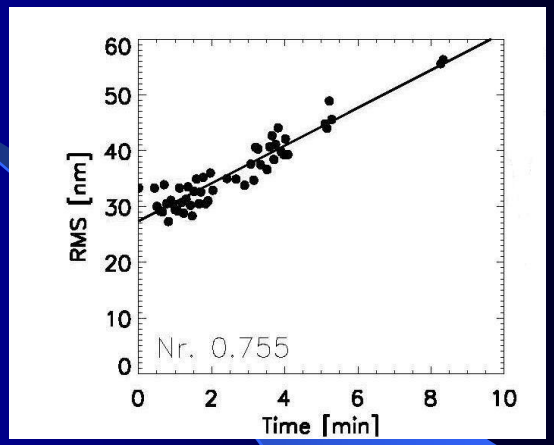


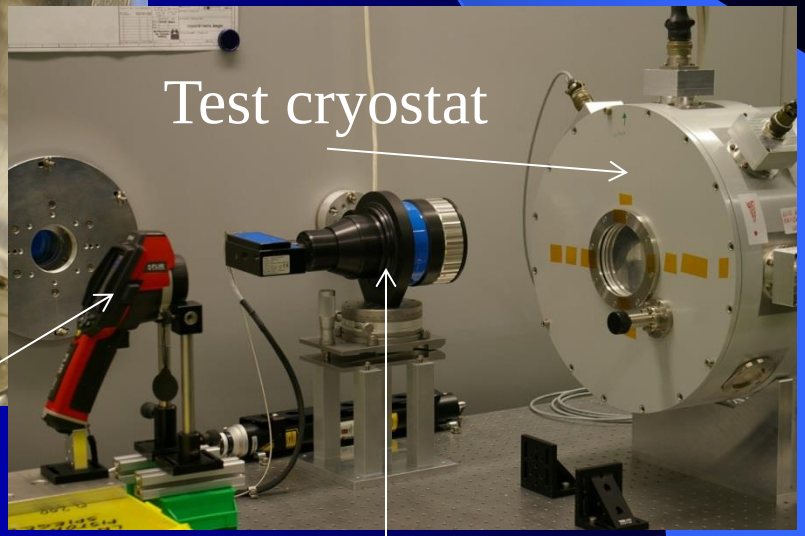
Testkryostat MPIA











Test cryostat

Mirrors under test

Thermal camera

Interferometer

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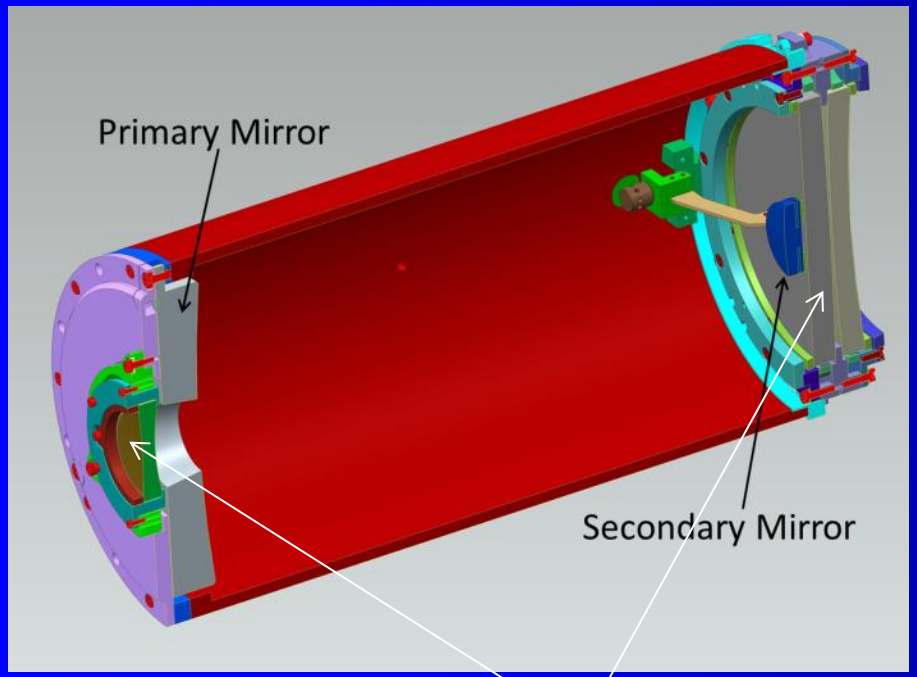
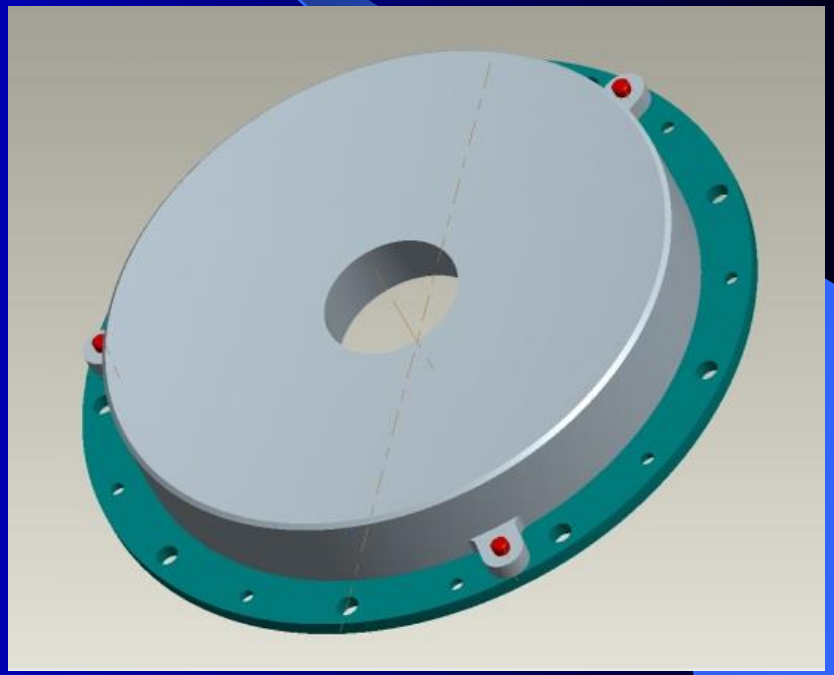
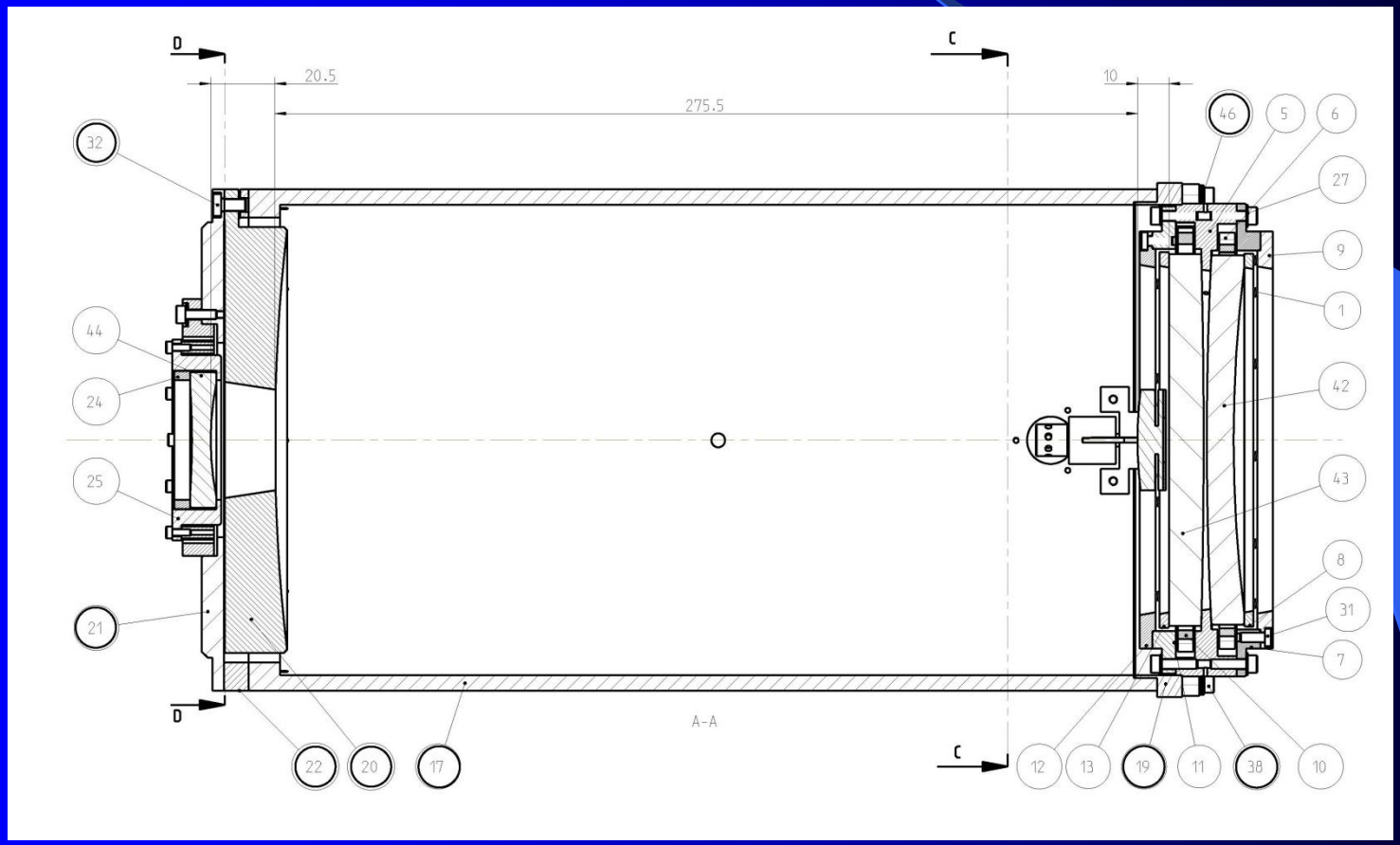
LUCI N30 Camera: New AlSi40 design



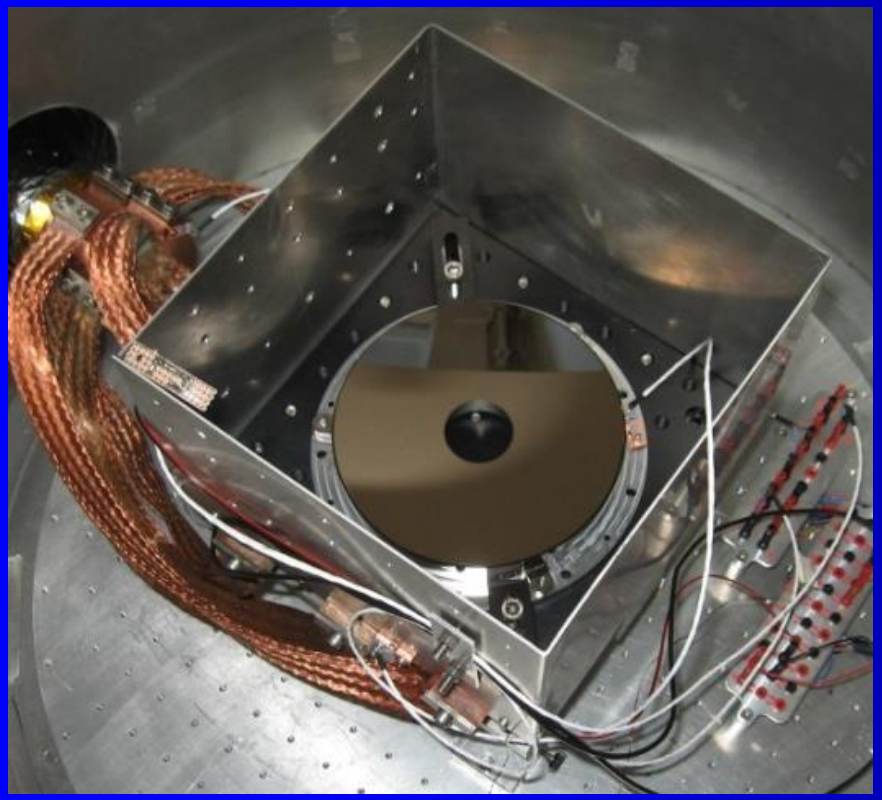


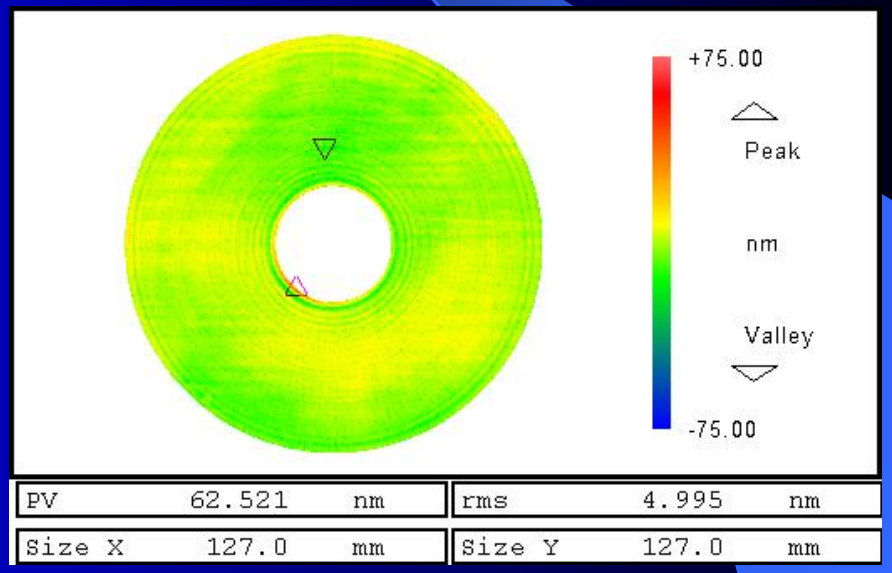
Lenses

LUCI N30 Camera: New AlSi40 design



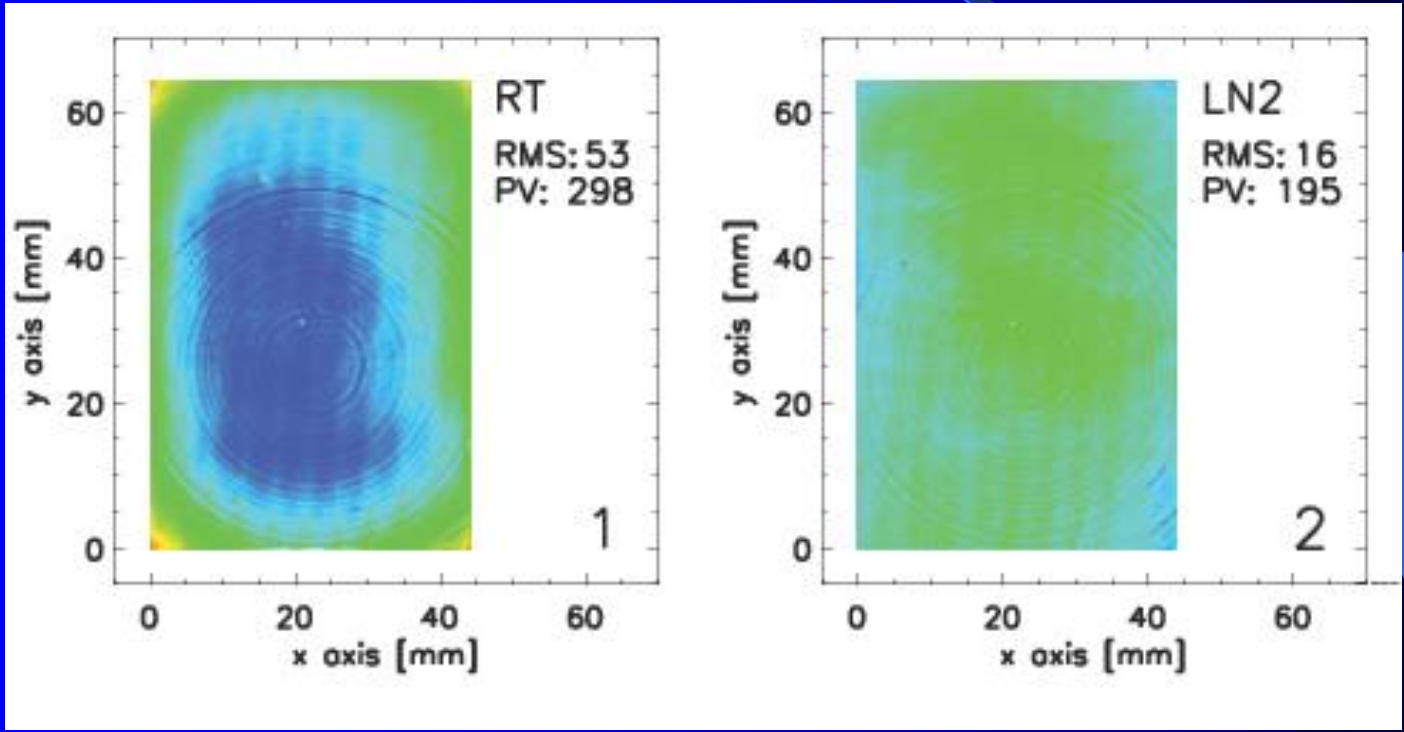
LUCI N30 Camera M1



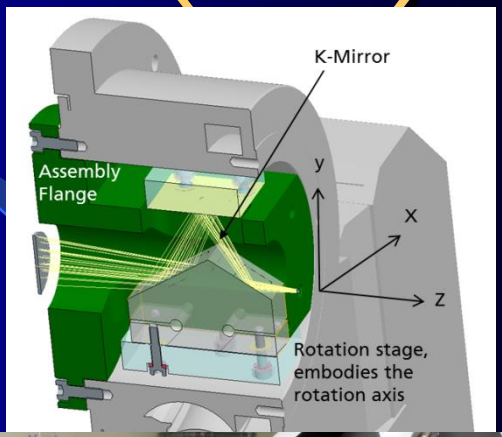


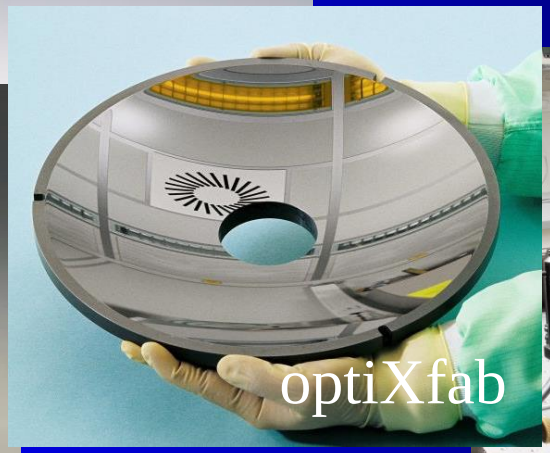
147 nm PV @ -180˚ C in its final mounting configuration

MRF - Correction



Examples AlSi40 Optics (IOF)



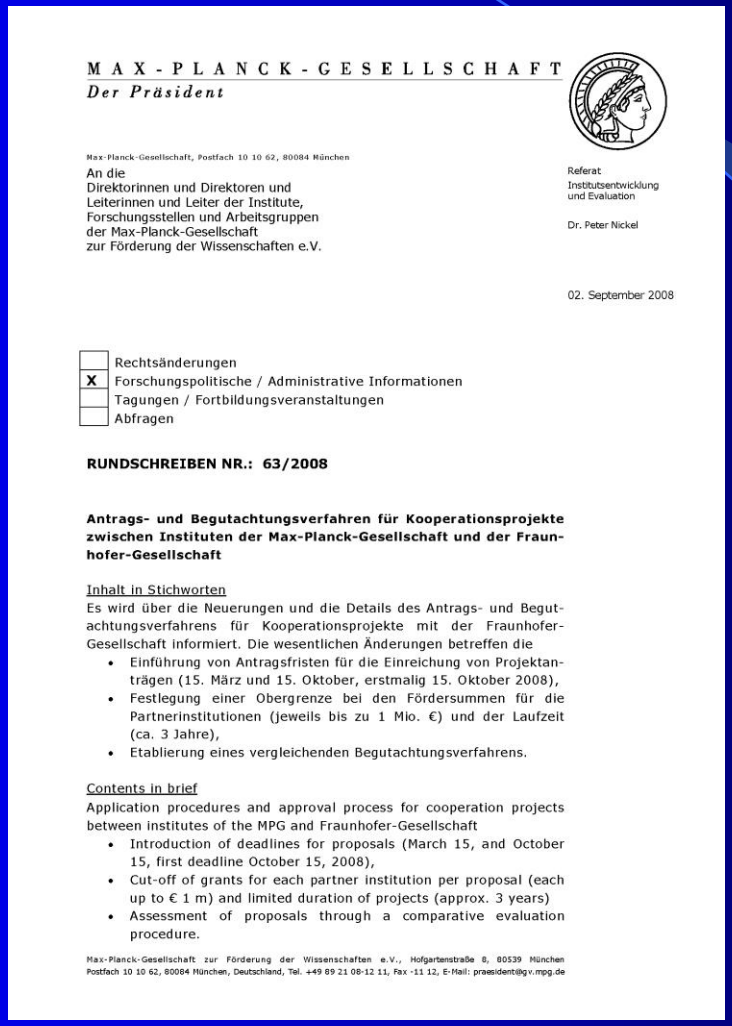


Unterstützt durch MPG und Fraunhofer mit 1,2 Millionen Euro

Publications

- Gebhardt, Risse, "New nickel plated metal mirrors utilizing meltspun aluminium silicon alloy", 9th International Conference of the European Society for Precision Engineering and Nanotechnology, 2009
- Rohloff, Gebhardt, Schönherr, Risse, Kinast, Scheiding, Peschel, "A novel athermal approach for high performance cryogenic metal optics", SPIE Astronomical Telescopes and Instrumentation, Proc. SPIE Vol. 7739, 2010
- Gebhardt, Risse, Kinast, Rohloff, Schönherr, Giggel, Löscher, "Nickel plated metal mirrors for advanced applications", 26th Annual Meeting of the American Society for Precision Engineering, 2011
- Gebhardt, Damm, Kinast, Rohloff, Lenzen, Rochau, "Ultraprecision manufacturing and alignment of the GRAVITY K-Mirror for the Very Large Telescope Interferometer", Proc. of the 12th Euspen International Conference, 2012
- Kinast, Grabowski, Gebhardt, Rohloff, Risse, Tünnermann, “Dimensional stability of metal optics on Nickel plated AlSi40”, International Conference on Space Optics, 2014
- Gebhardt, Kinast, Rohloff, Seifert, Beier, Scheiding, Peschel, “Athermal metal optics made of Nickel plated AlSi40”, International Conference on Space Optics, 2014
- Abschlußbericht Projekt MOT, Juni 2013
- Patent: Spiegelträger für einen optischen Spiegel **DE 10 2005 026 418**

Research and Innovation Pact



MAX-PLANCK-GESELLSCHAFT
Der Präsident

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An die
Direktorinnen und Direktoren und
Leiterinnen und Leiter der Institute,
Forschungsstellen und Arbeitsgruppen
der Max-Planck-Gesellschaft
zur Förderung der Wissenschaften e.V.

Referat
Institutsentwicklung
und Evaluation

Dr. Peter Nickel

02. September 2008

	Rechtsänderungen
X	Forschungspolitische / Administrative Informationen
	Tagungen / Fortbildungsveranstaltungen
	Abfragen

RUNDSCHREIBEN NR.: 63/2008

Antrags- und Begutachtungsverfahren für Kooperationsprojekte zwischen Instituten der Max-Planck-Gesellschaft und der Fraunhofer-Gesellschaft

Inhalt in Stichworten

Es wird über die Neuerungen und die Details des Antrags- und Begutachtungsverfahrens für Kooperationsprojekte mit der Fraunhofer-Gesellschaft informiert. Die wesentlichen Änderungen betreffen die

- Einführung von Antragsfristen für die Einreichung von Projektanträgen (15. März und 15. Oktober, erstmalig 15. Oktober 2008),
- Festlegung einer Obergrenze bei den Fördersummen für die Partnerinstitutionen (jeweils bis zu 1 Mio. €) und der Laufzeit (ca. 3 Jahre),
- Etablierung eines vergleichenden Begutachtungsverfahrens.

Contents in brief

Application procedures and approval process for cooperation projects between institutes of the MPG and Fraunhofer-Gesellschaft

- Introduction of deadlines for proposals (March 15, and October 15, first deadline October 15, 2008),
- Cut-off of grants for each partner institution per proposal (each up to € 1 m) and limited duration of projects (approx. 3 years)
- Assessment of proposals through a comparative evaluation procedure.

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